

DOCUMENT RESUME

ED 258 133

CS 007 629

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TITLE The Effects of Word Imagery on the Retention of Sight Vocabulary: An Investigation in Grade One.
PUB DATE May 84
NOTE 32p.; M.A. Thesis, Kean College of New Jersey.
PUB TYPE Reports - Research/Technical (143) --
Dissertations/Theses - Master Theses (042)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Beginning Reading; Child Language; Grade 1; *Imagery;
*Language Acquisition; Primary Education; Reading Instruction; *Reading Research; *Retention (Psychology); *Sight Vocabulary; Urban Education; *Word Recognition

ABSTRACT

A study was conducted to determine the effects of word imagery on the retention of sight vocabulary. It was hypothesized that in an urban, low income area first grade class there would be no significant difference between the acquisition and retention rates of high imagery words and those of low imagery words. Using one group of high imagery words and another of low imagery words drawn from "Imagery Ratings of 1,000 Frequently Used Words" (van der Veur 1975), the instructor prepared flashcards and presented them to 20 children in 25-minute sessions three days a week. At the end of each session, the cards were shuffled and displayed. The instructor called a word and each child had a turn to point to the correct word and name it. Posttesting was conducted two days and six weeks after the final session. Results showed that there was a significant difference in the acquisition and retention rates of high imagery words and those of low imagery words, with high imagery words recalled and retained at a significantly better rate than low imagery ones. The findings negated the hypothesis. (The list of words used is appended.) (FL)

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THE EFFECTS OF WORD IMAGERY ON THE RETENTION OF SIGHT VOCABULARY:
AN INVESTIGATION IN GRADE ONE

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Accepted
4/28/84
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Submitted in Partial Fulfillment of the Requirements
of the Master of Arts Degree
in
Reading Specialization

Kean College of New Jersey

May 1984

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ABSTRACT

This study was concerned with the effects of imagery on the acquisition and retention of sight vocabulary. The study was conducted with a population of twenty first grade children from a low income urban area. The results of this study indicated that there was a significant difference in the acquisition and retention rate of high imagery value words and low imagery value words. High imagery words were recalled and retained at a significantly better rate than low imagery words.

ACKNOWLEDGEMENTS

I would like to thank my students for their unknowing cooperation and their enthusiasm for learning. A special thanks to Mom and to Arlene, not only for their unending patience as sounding boards and proofreaders, but also for their support and encouragement of my efforts.

TABLE OF CONTENTS

I. ABSTRACT.....	1
II. ACKNOWLEDGEMENTS.....	11
III. LIST OF TABLES.....	1v
IV. THE EFFECTS OF WORD IMAGERY ON THE RETENTION OF SIGHT VOCABULARY: AN INVESTIGATION IN GRADE ONE.	
INTRODUCTION.....	1
HYPOTHESIS.....	3
DEFINITIONS.....	4
ASSUMPTIONS.....	4
LIMITATIONS.....	5
DELIMITATIONS.....	5
PROCEDURES.....	5
RESULTS.....	8
CONCLUSIONS AND IMPLICATIONS.....	10
V. WORD IMAGERY AND SIGHT VOCABULARY: RELATED RESEARCH.....	13
VI. REFERENCES.....	21
VII. APPENDIX.....	23
APPENDIX A IMAGERY RATINGS AND INSTRUCTIONAL VOCABULARY LIST...	24
APPENDIX B RAW POSTTEST SCORES OF HIGH IMAGERY WORDS.....	25
APPENDIX C RAW POSTTEST SCORES OF LOW IMAGERY WORDS.....	26

LIST OF TABLES

1. TABLE I

A Comparison of the Mean Posttest Scores of High and
Low Imagery Words.....8

2. TABLE II

A Comparison of Mean Posttest Scores in Terms of the
Amount of Recall of High to High Imagery and Low to
Low Imagery Words.....9

INTRODUCTION

The acquisition and mastery of sight vocabulary have always been key factors in the development and ability of a mature reader. Research describing the importance of sight vocabulary and its role in reading and comprehension has been noted and documented. It appeared reasonable to conclude that any aspects, conditions, or methods which affect the development and retention of sight vocabulary need to be considered and investigated. Advantages and disadvantages of the affecting points must be noted in order to base recommendations as to what factors would help enhance the development of vocabulary. Imagery, or the formation of mental pictures, was one of the factors which might affect vocabulary development. The degree to which the role imagery levels play in the development of sight vocabulary and its retention needed to be investigated.

In 1978, Edward Gickling and Charles Hargis conducted a study involving the effects of word imagery on sight word development. The focus of the study was to determine if there was a significant difference in the acquisition rate of high imagery and low imagery sight words. The study also investigated if the imagery level affected the retention of sight words. Kindergarten non-readers were the sole population in this study. In 1981 further research on the effects of imagery in sight word recognition was conducted by Hargis, Gickling, and Alexander in which the researchers compared two different populations. The researchers compared retarded children

with a chronological age between 9.4 and 16.5 years and a mental age between 4.0 and 5.8 years with a group of nonretarded kindergarten children ranging from 5.2 to 6.0 years in both chronological and mental ages. The results of both of these investigations indicated that imagery level was an important factor. High imagery words were recalled and retained at a far better rate than the low imagery words in the kindergarten study as well as for the comparison study of retarded versus nonretarded groups. Both studies by Gickling dealt with kindergarten aged children or at least with children with a mental age associated with kindergarten aged children.

Jorm's study (1977) dealt with experiments on the effect of word imagery on reading difficulty. The subjects ranged in chronological age from 8 to 11 years and included remedial readers as well as good readers. The results of all three experiments indicated that when using the whole word approach, high imagery words were frequently easier to recall for both the good and the remedial readers. It was noted that the good readers were difficult to assess because their results frequently were masked due to the fact that they were often able to reach the ceiling on all sets of stimulus words.

Research (Wolpert 1972) was conducted with a population of suburban first grade children on the effects of imagery as well as the influence of word shape and length on word recognition. In the suburban area, high imagery words were also found to be recalled with greater frequency than low imagery words. The results also indicated that the subjects were able to learn a greater number of

3

words containing three letters than five but that the imagery level remained the more important factor. Configuration was noted to be less important than either imagery or word length.

The question this researcher was concerned with was that, if an investigation were conducted in an urban setting with a population of first grade beginning readers, would the results of the effects of imagery be similar to those of the previously cited studies? If not, would the results then indicate that there were no significant differences in the acquisition and retention of high imagery and low imagery sight words in an urban first grade?

HYPOTHESIS

A study was conducted to determine the effects of word imagery on the retention of sight vocabulary. It was hypothesized that in an urban, first grade class there would be no significant difference between the acquisition and retention of high imagery words and low imagery words.

DEFINITIONS

IMAGERY--the concreteness of a word is related to how easily a mental image may be formed of the referent the word represents.¹

EXAMPLES:

HIGH IMAGERY WORDS--tree, house, car

LOW IMAGERY WORDS---day, mile, time

RETENTION--learning that fosters later recall or recognition.²

SIGHT VOCABULARY--words that are memorized or recognized as wholes without word analysis.³

ASSUMPTIONS

It was assumed that the children would have the maturation and readiness skills necessary for the learning of reading vocabulary and that the children involved in the study were in the average I.Q. range. It was also assumed that the method of instruction would insure that the stimulus vocabulary would allow enough practice for the words to be retained. The vocabulary selected was frequently used, every day words found in the children's oral and listening vocabulary.

1. Gickling, Edward E., and Hargis, Charles. "The Function Of Imagery In Word Recognition Development", (1978), page 870.

2. Bush, Clifford L., and Andrews, Robert C., (1973), page 73.

3. Ibid, page 93.

LIMITATIONS

This study, due to an inability to choose a random selection for a population, was limited to a pre-assigned class of first grade children. The study was also limited due to the small sampling of stimulus words which were presented.

DELIMITATIONS

The data of this research was a reflection of a small sampling of first grade pupils from a low economic, urban setting. The conclusions of this research are not to be extended beyond the population sampled.

PROCEDURES

Two groups of initial stimulus words were formulated. Group A was comprised of high imagery words and Group B was comprised of low imagery words. The stimulus words were selected from the van der Veur (1975) list of "Imagery Ratings of 1,000 Frequently Used Words". The high imagery stimulus words selected for use in the pretest had an imagery rating of not less than 6.22, and the low imagery words selected had an imagery rating of not higher than 4.8. The children were pretested individually. Each stimulus word was printed on an index card and presented to each child one

at a time. Each child was asked to read the word printed on the card. A five second time span was allowed for a response. Any known words were discarded so as to not contaminate the study. From this pretest two final lists of instructional stimulus words were developed. List A consisted of twenty high imagery words with a mean imagery rating of 6.58 and List B consisted of twenty low imagery words with a mean imagery rating of 3.54.

During the instructional sessions, the stimulus words were randomly mixed (high and low imagery together) before their presentation. Five stimulus words per session were introduced. Instructions were given verbally and reading consisted only of the printed stimulus words and sentences containing the stimulus word. All words were presented without any picture clues. Instruction was conducted three days a week with the alternate days to be used as make-up days if needed. Sessions ran approximately twenty five minutes. Each session began with a flash card review of the five words from the previous session. The five old words were shuffled and displayed. The instructor read one of the words out loud and each child had a turn to point to the word that had been called out and then in turn read the word out loud himself.

For the instruction of the new vocabulary, each word was presented singularly to the class on a flash card. The children were directed to look closely at the word while the instructor pronounced it. The class repeated the word and traced it in the air while saying it. The instructor then presented the word in context orally. All stimulus words were presented solely in noun form. The children then

2

repeated the word. Next, they read the word in context from a sentence on the chalkboard. Finally the children were directed to look closely again at the word on the flashcard and to read it out loud once more. These steps were repeated for each of the five stimulus words introduced in a given session.

At the close of each session the five index cards were shuffled and displayed. The instructor called a word and each child had a turn to point to the correct word and name it again.

The design of this study called for two posttests. The initial posttest was to record the acquisition differences between high imagery and low imagery words. The initial posttest was administered two days after the final instructional period. The children were all tested individually utilizing flash cards with the stimulus words printed on them. The stimulus words again were randomly mixed (high and low imagery) for their presentation. Five second intervals was the maximum time allotted for a response and only exact responses were accepted.

The delayed posttest was to record the differences in the retention rate between high and low imagery words. The delayed posttest was administered six weeks after the final instructional session. The administration procedures for the delayed posttest were identical to those of the initial posttest. Again, only exact responses were accepted.

RESULTS

The results of the study indicated that there was a significant difference in the acquisition and retention of high imagery words and low imagery words. The results, as shown in Table I, indicated

TABLE I

A COMPARISON OF THE MEAN POSTTEST SCORES
OF HIGH AND LOW IMAGERY WORDS

<u>INITIAL POSTTEST</u>	<u>Mean of Words Recalled</u>	<u>Variance</u>	<u>S.D.</u>	<u>t-value</u>
High Imagery	18.95	1.63	1.27	16.29
Low Imagery	13.8	18.89	4.32	
<u>DELAYED POSTTEST</u>				
High Imagery	17.9	3.88	1.97	20.24
Low Imagery	11.5	16.89	4.11	

that high imagery words were recalled at a much better rate than low imagery words across both posttesting conditions. The mean number of high imagery words retained was 18.95 as compared to the mean of 13.8 for low imagery words in the initial posttesting session. The standard deviations for the two mean scores were 1.27 for high imagery words and 4.32 for the low imagery words. A t-test comparing the results of the initial posttesting session indicated a t-value of 16.29 which was significantly far below the one percent level.

The results of the delayed posttest also indicated a better retention rate for high imagery words than for low imagery words. The mean number of high imagery words retained was 17.9 as compared to the mean of 11.5 for low imagery words. The standard deviations of the delayed posttest were 1.97 for high imagery words and 4.11 for low imagery words. The t-test revealed a 20.24 t-value which was also significantly far below the one percent level.

Separate t-tests were conducted in order to compare the amount of recall of high imagery words from one posttest to the other and the amount of recall of low imagery words from one posttest to the other. The results, as shown in Table II, indicated that there

TABLE II

A COMPARISON OF MEAN POSTTEST SCORES IN TERMS OF THE AMOUNT OF RECALL
OF HIGH TO HIGH IMAGERY AND LOW TO LOW IMAGERY WORDS

<u>HIGH IMAGERY WORDS</u>	<u>Mean of Words Recalled</u>	<u>Word Loss</u>	<u>t-value</u>
Initial Posttest	18.95		
Delayed Posttest	17.9	1.05	3.32
<u>LOW IMAGERY WORDS</u>			
Initial Posttest	13.8		
Delayed Posttest	11.5	2.3	7.27

was a significant loss in word retention for high imagery words as well as low imagery words over the six week posttesting period. The

difference between the mean scores of the high imagery words was 1.05 which expressed a t-value of 3.32. The difference between the mean scores of the low imagery value was 2.3 which expressed a t-value of 7.27. The t-values for the high imagery words and low imagery words were both shown to be below the one percent level. However, there was a greater loss involving words with low imagery ratings than those with high imagery ratings. Also to be considered was the difference between the amount of words retained initially. A greater number of high imagery words were recalled in the final posttest than were even recalled in the initial posttest (17.9 high imagery versus 13.8 low imagery).

CONCLUSIONS AND IMPLICATIONS

The results of both posttests negated the hypothesis that there were no differences in the effects of imagery on sight word retention. The conclusions of this study with regards to the effects of imagery were found to be in agreement with the conclusions of the previously cited studies of Gickling, Wolpert and Jorm. The data supported the supposition that imagery was an important factor in the acquisition and retention of sight vocabulary. At the beginning reading stage, imagery helped provide a concreteness which facilitated sight word recognition.

The results of this study are of importance to educators, publishers, and parents alike. Because of the differences in acquisition and retention rates of high and low imagery words,

the nature of vocabulary being presented must be taken into account. Since high imagery words are more easily learned, perhaps more of these words should be placed in basal readers and suggested word lists. This would be advantageous, especially in the early stages of reading or for the slower or remedial reader where success is such an important factor. High imagery words offer a means for achievement for the developmental, the corrective and the remedial reader with respect to increasing their sight vocabulary.

The method of instruction for sight words must be taken into account. Jorm (1972) noted in his study that when using the whole word approach, words with high imagery brought the most favorable results for retention. What method then, helps enhance the acquisition of low imagery words? Educators and parents need to be aware of which words are more easily mastered and retained. In as much as high imagery words are more readily mastered, what amount of practice needs to be provided for low imagery words to insure their retention?

This present study was concerned with the comparison of the retention rates of high and low imagery nouns. How does imagery level affect the acquisition of other types of words? Gickling, et al (1981) recognized this and recommended that further research is needed to determine the effects of imagery on other words such as structure words, determiners, prepositions, auxiliary words, conjunctions, verbs, adjectives, and quantifiers. When dealing with low imagery words, should they be utilized more in context or would pairing high imagery words with low imagery help to improve the acquisition of sight vocabulary. To what degree does context raise

imagery level and what type of contextual settings (paired words, phrases, sentences) is necessary to obtain mastery?

Since there is a difference in the retention rate of high imagery words and low imagery words, this should indicate that sight vocabulary should not be arbitrarily presented in basal readers or be practiced without concern for method or concept.

These issues are ones of concern and need to be dealt with. The answer to the questions posed by high and low imagery words and the learning differences of each needs to be established in order to take advantage of the best possible road to sight vocabulary mastery.

WORD IMAGERY AND SIGHT VOCABULARY: RELATED RESEARCH

The role that imagery has played has been of interest to researchers and educators for quite some time. A report done by Allan Paivio (1970) delved into the historical background of the concept of imagery and how it related to learning and memory. Paivio noted imagery has had two theoretical functions. One, dating back to Plato, was that of a wax-table model of memory where perceptions and thoughts are impressed on the mind as if it were a tablet of wax. The second theoretical view was that of an associative mediator. This model involved a system of well ordered memory places. Points or images to be remembered were visualized in specific locations. From these locations they were retrieved by mentally retracing the places in order. Paivio related that how over the centuries a variety of interpretations of these theories developed. An overview of contemporary theories and approaches to the role of imagery were next discussed by Paivio including his own "conceptual peg" hypothesis. Paivio described his theory in that concrete or high imagery stimulus terms function as pegs. On these conceptual pegs, associates can be hung and later recalled. Paivio reviewed a series of studies that he and others have conducted which reinforce the concepts of this theory. The studies reflected the approach that imagery is defined in terms of these stimulus meanings.

One such study conducted by Paivio was in 1968 which dealt with the effects of imagery. In conjunction with Stephen A. Madigan, Paivio conducted a learning experiment dealing with high

and low imagery nouns and their rated capacity to evoke imagery. The nouns were paired with either high or low association value trigrams (three letter combinations). The stimulus-response order of the pairs were varied: high noun--high trigram, high noun--low trigram, low noun--high trigram, and low noun--low trigram. Subjects were all adults and ranged from eighteen to twenty four. The results indicated that the effect of imagery on the stimulus side of the pair was greater when the noun was of high imagery value. The results of the effect of imagery on the response side of the pair were greater also when the trigram was of high associative value. High imagery stimuli facilitated or influenced the S-R linkage as learning progressed. Paivio stated that this was possible because high imagery nouns can be stored as concrete images as well as words thereby enhancing the probability of their recall.

Hayne W. Reese also discussed the interest in imagery for which a symposium was held at the biennial meeting of the Society of Research in Child Development in March of 1969. Reese discussed that the effects of imagery had become not only respectable in the field of psychology but relatively popular. He related the thrust of the symposium was theoretical with respect to the work in imagery and how it affected children's learning. Reese suggested that these theoretical analyses are applicable beyond childhood. The data can yield insights into the mechanisms involved not only in childhood but adulthood as well.

Research was conducted in 1970 by Hayne Reese. The research involved the use of imagery in context. The results of this study indicated that imagery conditions are less effective than sentences for younger preschool children. However, imagery conditions facilitated performance as much as sentences in older children and adults. In order to account for this difference between the age groups, Reese offered six possible explanations: a) deficit in verbalization, b) defective visual memory, c) production deficiency, d) mediation deficiency, e) leveling, and f) failure to "read". Reese discussed the inconsistencies of the first five assumptions. Referring to other studies, he noted how those assumptions were inconsistent and how they disagreed with theories of cognition in young children. Comparing his findings with other research, Reese favored the evidence for the last interpretation of a failure to "read". Younger children tended to list the specifics of a picture and not the interactions within the picture. It was not that imagery was less effective, but that imagery was not effectively aroused. When given a sentence, however, imagery was aroused because the elements and their interactions were all specifically spelled out.

In 1970 a report was constructed which reviewed the conclusions of a number of experiments concerned with the role of imagery in children's learning. William D. Rohwer found that the rated imagery of nouns bore a decided relationship with the ease of learning. Concrete nouns were higher in imagery value and were far easier to learn than abstract nouns. Rohwer stated that the preferred mode for storage for younger children was imagery

and pictures were more likely to evoke imagery than words. Since the requirement of a response was usually given verbally this entailed a transformation of information if it was stored visually. Therefore, picture-word pairs were superior to other associations. Rohwer noted that imagery is most effective when a verbal label was stored with the image and that the developmental trend resulted from a failure of the young child to make such verbalizations. Rohwer also cited in this report that nouns related by verbs would be more image evoking than nouns related by prepositions, and both would be more image evoking than nouns related by conjunctions.

Daniel A. Yarmey and Norma V. Bowen in 1972 conducted a study which researched noun-picture paired associates presented under one of three instructional conditions: intentional imagery, incidental imagery, or intentional control (no imagery). The subjects consisted of two populations. One group was composed of forty five educable retarded children and the other group was composed of forty five normal children. All children were aged eight to thirteen years. The results indicated that recall in both imagery conditions were found to be superior than the intentional control condition. In addition, imagery instructions facilitated incidental recall of the retarded subjects equal to that of the normal children in the intentional imagery condition. Yarmey and Bowen stated that these findings suggested that children would benefit from in classroom associative tasks that involved the use of imagery and when the information was presented pictorially, help should be given to assist the transformation processes which are necessary

to change the nonverbal image into verbal responses.

In 1972, research was conducted to investigate the effects of word length, word shape, and imagery on word recognition with suburban first grade children. The study took into account three variables: length (three to five letters in each word), shape (configuration), and imagery (high versus low concreteness). The results of the study pointed out that with a population for first grade children more words with three letters were learned than words with five letters. High imagery words were recalled more than low imagery words. An analysis of the effect of word shape was limited with this study because of the changing variable of length. It did suggest that shape was less important than either length or imagery.

Barbara van der Veur in 1975 conducted a study in order to rate the imagery value of core vocabulary of first grade children. She scaled a modified list of 1,000 words selected from E.B. Coleman's list.⁴ van der Veur acknowledged that Coleman indexed in 1971 the importance of these 1,000 words and found that they accounted for 92 % of a first grader's speech.⁵ The words were rated in van der Veur's study by graduate students as being high, medium, or low imagery.

4. Coleman, E. B. Collecting A Data Base For A Teaching Technology, (Volume 1), (Final Report, Department of Health, Education, and Welfare Grant Number O E G 7-9-530279-0122), El Paso: University of Texas at El Paso, Department of Psychology, 1971.
5. Coleman, E. B. Collecting A Data Base For A Teaching Technology, (Volume 2), (Final Report, Department of Health, Education, and Welfare Grant Number O E G 7-9-530279-0122), El Paso: University of Texas at El Paso, Department of Psychology, 1972.

756 words were then taught to sixty three kindergarteners and first graders. The results indicated that more subjects read high imagery words than low imagery words. van der Veur noted that the imagery rating was related to the subjects ability to learn to read the words and that these results demonstrated that the imagery ratings of these words should be of considerable use to the field of reading.

Jorm's study (1977) dealt with three experiments on the effect of word imagery, length and frequency on reading difficulty. The subjects ranged in chronological ages from eight to eleven years old. Experiment I dealt solely with poor readers while Experiment II and III dealt with both poor and good readers. The results of these experiments indicated that for both good and poor readers, high frequency words were easier to recall and word length had little effect of reading difficulty. High imagery words were easier to recall for poor readers, especially when forced to use the whole word approach. Jorm recommended that the imagery factor should be taken into account when selecting vocabulary for remedial readers.

Edward E. Cickling and Charles H. Hargis in 1978 conducted a study to test the imagery factor in the acquisition and retention of sight vocabulary. The population consisted of a small sampling of kindergarten children with a chronological age of 5.2 to 6.0 years and I.Q. scores in the average range. The results indicated that for kindergarten children there was a significant difference in the retention of high and low imagery words. High imagery words were retained longer.

In 1981 further research on the effects of imagery in sight

word recognition was conducted by Edward E. Gickling, Charles H. Hargis, and Deborah R. Alexander. This study researched the effect of imagery on sight word recognition with comparisons made with two different populations. The researchers compared retarded children with a chronological age between 9.4 and 16.5 years and a mental age between 4.0 and 5.8 years with a group of nonretarded kindergarten children ranging from 5.2 to 6.0 in both chronological and mental ages. The results of this study indicated that imagery was an important factor with both the retarded and nonretarded groups. High imagery words were recalled at a far better rate than the low imagery words.

In view of the evidence supporting the positive effects, imagery has presented itself as an avenue towards success. High imagery has proven to be generally successful across a variety of age groups and populations. Any means which can ease the task of mastering vocabulary is one that should be given high consideration and application.

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APPENDIX

APPENDIX A
INSTRUCTIONAL VOCABULARY LIST
AND IMAGERY RATINGS ⁶

<u>HIGH IMAGERY</u>	<u>RATING</u>	<u>LOW IMAGERY</u>	<u>RATING</u>
airplane	6.7049	answer	3.0328
bananas	6.5246	color	4.6721
bus	6.5082	day	4.8261
car	6.7541	end	4.0984
chair	6.6393	everybody	3.7377
cookies	6.5246	idea	2.9836
dog	6.6674	line	4.8525
eggs	6.5574	minute	3.6230
elephant	6.7377	name	4.0820
fish	6.7213	nothing	2.6885
house	6.5410	place	3.6230
lion	6.6885	time	3.6066
mouse	6.4098	today	3.3279
pen	6.5574	tomorrow	3.3934
puppy	6.6721	turn	3.3279
scissors	6.4754	way	2.3443
train	6.5410	week	3.6066
tree	6.6230	wish	2.9672
turtle	6.4918	years	2.8525
umbrella	6.2295	yesterday	3.1311

6. Imagery ratings as presented in the Coleman-van der Veur list of "Imagery Ratings Of 1,000 Frequently Used Words."

APPENDIX BRAW SCORES OF HIGH IMAGERY WORDS

<u>Stimulus Words</u>	<u>Initial Posttest</u>	<u>Delayed Posttest</u>
airplane	19	15
bananas	20	19
bus	20	20
car	20	19
chair	17	18
cookies	19	18
dog	20	20
eggs	20	20
elephant	19	18
fish	20	20
house	20	20
lion	19	18
mouse	20	18
pen	19	18
puppy	17	16
scissors	18	15
train	17	15
tree	19	17
turtle	16	14
umbrella	20	20

APPENDIX CRAW SCORES OF LOW IMAGERY WORDS

<u>Stimulus Words</u>	<u>Initial Posttest</u>	<u>Delayed Posttest</u>
answer	12	10
color	17	15
day	20	20
end	16	12
everybody	6	6
idea	11	8
line	16	7
minute	11	9
name	18	15
nothing	8	10
place	14	11
time	19	14
today	20	18
tomorrow	12	9
turn	6	5
way	11	13
week	15	10
wish	15	11
years	11	9
yesterday	18	18